

Lightweight Structures Utilizing CNFs, Phase I

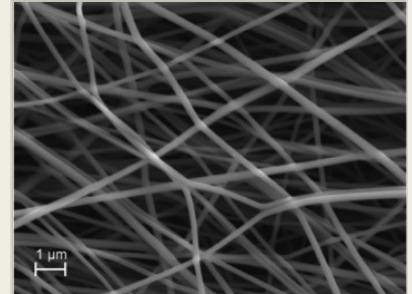
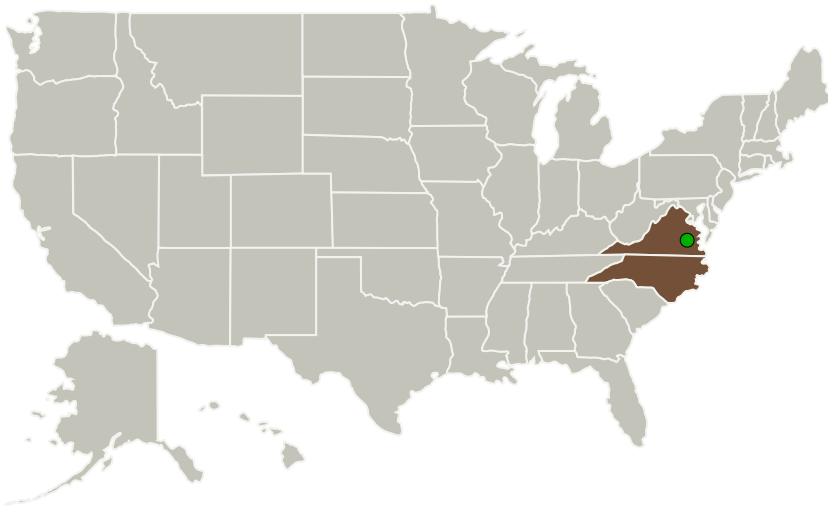
Completed Technology Project (2014 - 2014)



Project Introduction

AxNano proposes a novel method for producing robust, high-volume, cost-effective carbon fibers in support of next-generation materials for structural composite space applications. AxNano will utilize a needle-less electrospinning method to form precise bundles of nano-fibers. The spinning and draw method will be designed to achieve the structural perfection needed for leaps in mechanical strength and stability of carbon fibers. This proposed work effort will establish an advanced manufacturing process, controlled at the nano/molecular scale. Efficacy will be shown by producing articles at the coupon scale, which are expected to possess better mechanical properties - double those for current epoxy CFRP technology. This new continuous carbon nano-fiber (CNF) manufacturing process will produce CNFs with reduced defects, increased uniformity, and much higher strength. This project aims at innovative nanomaterial based polymeric composites with potential to supplant conventional carbon fiber reinforced polymeric (CFRP) composites as lightweight aerospace structural materials for space applications. Specifically the project addresses fundamental challenges in mass-manufacturing continuous and high-strength carbon nanofiber yarns, weaves and next-generation carbon nanofiber yarn-reinforced polymeric composites (CNFYRP).

Primary U.S. Work Locations and Key Partners



Lightweight Structures Utilizing CNFs Project Image

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Organizations Performing Work	Role	Type	Location
AxNano, LLC	Lead Organization	Industry	Danville, Virginia
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia
North Carolina A & T State University	Supporting Organization	Academia	Greensboro, North Carolina

Primary U.S. Work Locations

North Carolina	Virginia
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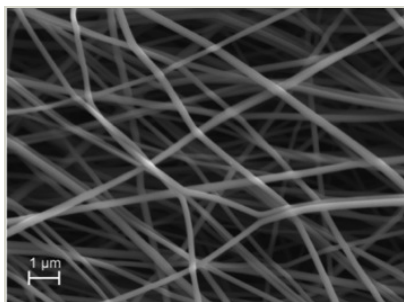
Project Transitions

**June 2014:** Project Start**December 2014:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/137664>)

Images



Project Image

Lightweight Structures Utilizing CNFs Project Image
(<https://techport.nasa.gov/image/127909>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

AxNano, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

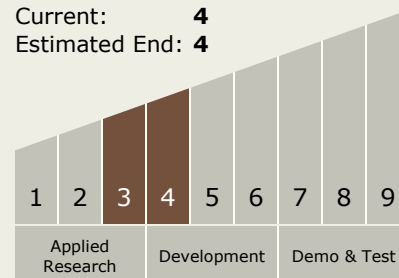
Carlos Torrez

Principal Investigator:

Charles Gause

Technology Maturity (TRL)

Start: 3
Current: 4
Estimated End: 4



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.1 Materials
 - └ TX12.1.1 Lightweight Structural Materials

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System